



Texas Alliance for Water Conservation: Farmers teaching farmers how to manage water like money

One can't talk about agriculture in the Texas High Plains without including "water" in the same sentence. The Ogallala Aquifer, which has kept ag production humming for nearly a century, is running low. Agriculture in the Texas Panhandle and Southern Plains is adapting to decreased water availability.

For nearly two decades, researchers and producers across the Texas High Plains have been developing integrated crop/livestock production systems that address the growing need for water conservation, while keeping soils fertile, crop yields profitable, cattle production thriving, and surrounding communities viable.

Funded through nearly \$1.5 million in Southern SARE Research & Education, Large Systems, and Graduate Student grants, the results showcase long-term alternative production systems, and how those results are being translated into practical field production practices and sustainable agriculture applications.

This model of sustainable agroecosystems in the Texas High Plains is changing the face of agriculture in the region and helping to conserve water, improve soil health, boost ag profits and keep the High Plains region thriving for generations to come.

This bulletin highlights the TAWC -- a producer-driven effort that demonstrates best water management practices in the Texas High Plains.



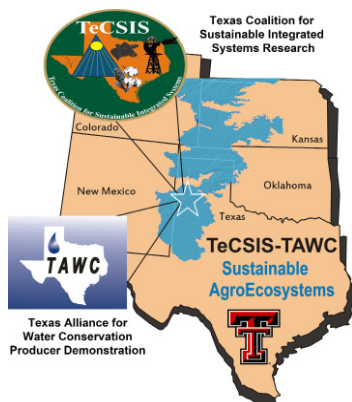
For over a decade, producers across the Texas High Plains have been educating other producers on production methods and new technologies that help save water.

The Texas Alliance for Water Conservation (TAWC) in Lubbock, TX consists of about 30 producers across 9 counties who use 6,000 acres of land to demonstrate a range of agricultural practices, including monoculture cropping systems, crop rotations, no-till and tillage practices, land applications of manure and fully integrated crop and livestock systems. The demo sites, along with resources, events and other activities, follow an outreach/educational model similar to the Cooperative Extension Service.

TAWC director Rick Kellison said that SARE funding for Texas Tech University helped launch the TAWC producer demonstration project.

"It helped create an avenue to disseminate information and to better maximize production, while conserving natural resources," said Kellison.

In 2004, information generated from a SSARE-funded research grant project (**LS02-131**), "Forage and Livestock Systems for Sustainable High Plains Agriculture," was the basis for obtaining a \$6.2 million grant from the Texas Water Development Board to test concepts of integrated systems in an on-farm demonstration project. The TAWC was born.



“The TAWC is a producer-led project that teaches other producers how to manage water like money,” said Philip Brown, Texas Tech University Texas Coalition for Sustainable Integrated Systems Research (TeCSIS) program senior research associate.

Social science research has confirmed the existence of three categories of producers in the region. One category consists of producers who are eager to learn more about integrated systems and are likely to adopt them. A second category includes producers who are very interested in integrated systems, but wait on adopting advanced water conservation practices to attain greater confidence that they pay off. The final category consists of producers who are likely to con-

tinue their current water management practices. TAWC educates and encourages producers to adopt the best technologies available for getting the most efficient conversion of a declining supply of water to profitable crop yield.

“The organization contributes ideas, information, and opportunities to area producers to assist them in making rational choices and decisions about their farming systems,” said Brown. “It’s bridging field research with aggressive and progressive Extension-style programming.”

Some of the technologies that the TAWC has demonstrated include Smartfield™ -- an irrigation management tool that monitors crop water stress and alerts the producer when irrigation is needed; John

Water Management: Which system is best?



The following is an example of data collected over a five-year study on water management in various production systems:

Producer systems represented 1.) monoculture cotton, sunflowers, and perennial grass seed and hay systems; 2.) multi-crop systems including cotton in rotation with corn, grain sorghum, wheat for grain, or rye, as well as rotations of corn and sunflowers, and a sorghum/wheat rotation; 3.) integrated crop/livestock systems including both cow/calf and stocker cattle systems, and 4.) a perennial-grass, cow/calf, hay system.

Irrigation types included subsurface drip, center pivot, furrow irrigation, and non-irrigated systems.

Comparisons among system types showed that more irrigation water was applied to grass seed monocultures than any other system type. In descending order of irrigation amounts, grass seed was followed by cotton grown in monoculture systems, multi-cropping systems, sunflowers, and integrated crop/livestock systems. The cow-calf forage system used the least amount of irrigation water.

Net returns per acre-inch of irrigation water were highest for the grass seed monoculture systems. In descending order this was followed by multi-cropping systems, the cow-calf system, integrated crop/livestock systems, cotton monocultures, and sunflowers grown in monoculture (less than \$2/acre). Net returns per system acre were highest for the grass seed monoculture (about \$480/acre), followed by multi-cropping systems (about \$120/acre), integrated crop/livestock systems (about \$100/acre), cotton monoculture systems (about \$70/acre), cow-calf/forage system (about \$60/acre) and sunflowers (about \$10/acre).



TAWC director Rick Kellison. Photo credit: Southern SARE

Deere Field Connect™ – a tool that uses probes to monitor soil moisture levels; AquaSpy – a sensor that monitors water taken up by the plant roots; and TAWC Solutions – a web-based management decision tool that aids in the application of irrigation water.

In addition, producers within TAWC are also exploring technologies related to drip irrigation, center pivot irrigation, and variable rate systems.

In addition to technological advancements, data are being collected from the field sites that help to demonstrate best water management practices.

“The one thing that the TAWC helps farmers understand is that there is no “one size fits all” system,” said Kellison. “As someone once told me, there is no silver bullet, but a bunch

of silver BBs, and if you throw enough of them, you’re bound to hit something. The TAWC helps provide producers with a toolbox of options.”

The outreach effort in the TAWC project has been very successful in reaching farmers and disseminating information on best practices for managing irrigation. An additional \$3.6 million was obtained from the Texas Water Development Board to continue TAWC through 2019. In 2015, the program was awarded the Texas Environmental Excellence Award from the Texas Commission on Environmental Quality.

“This is an example of how the support of research infrastructure at the Texas Tech New Deal Research Farm has been leveraged to amplify the transfer of sustainable agricultural technology in the Southern High Plains,” said Brown. “That leverage was made possible through SARE funds, and it’s making a major impact. It’s valuable to producers, and that’s huge.”

For more information on the Texas Alliance for Water Conservation, visit <http://www.depts.ttu.edu/tawc/>

High Plains Water Conservation Resources

General Information

Texas Coalition for Sustainable Integrated Systems (TeCSIS)
<http://www.orgs.ttu.edu/forageresearch/>

Texas Alliance for Water Conservation
<http://www.depts.ttu.edu/tawc/>

TAWC Solutions
<http://www.tawcsolutions.org/>

Texas Water Development Board
<http://www.twdb.texas.gov/groundwater/aquifer/majors/ogallala.asp>

Texas High Plains Water District
<http://www.hpwd.org/>

USDA-ARS Ogallala Aquifer
<http://ogallala.ars.usda.gov/>

Publications

High Plains Water Conservation Bulletin No. 1: Water Conservation in the Texas High Plains

High Plains Water Conservation Bulletin No. 2: Sustainable Crop/Livestock Systems in the Texas High Plains Phase I

High Plains Water Conservation Bulletin No. 3: Sustainable Crop/Livestock Systems in the Texas High Plains Phase II

High Plains Water Conservation Bulletin No. 4: Sustainable Crop/Livestock Systems in the Texas High Plains Phase III

High Plains Water Conservation Bulletin No. 5: Diversifying in the Texas High Plains

High Plains Water Conservation Bulletin No. 6: Agroecosystems Economics in the Texas High Plains

High Plains Water Conservation Bulletin No. 7: Soil Quality of Integrated Crop/Livestock Systems

High Plains Water Conservation Bulletin No. 9: Water Use of Old World Bluestems in the Texas High Plains

High Plains Water Conservation Bulletin No. 10: Cover Crops and Cotton in the Texas High Plains

High Plains Water Conservation Bulletin No. 11: Agroecosystems Research in the Texas High Plains

Grant Projects

GS15-152 Evaluation of Winter Annual Cover Crops Under Multiple Residue Managements: Impacts on Land Management, Soil Water Depletion, and Cash Crop Productivity

LS14-261 Long-term Agroecosystems Research and Adoption in the Texas Southern High Plains: Phase II

LS11-238 Long-term Agroecosystems Research and Adoption in the Texas Southern High Plains: Phase I

LS10-229 Integrated Crop and Livestock Systems for Enhanced Soil Carbon Sequestration and Microbial Diversity in the Semiarid Texas High Plains

LS08-202 Crop-livestock Systems for Sustainable High Plains Agriculture

LS02-131 Forage and Livestock Systems for Sustainable High Plains Agriculture

GS07-056 Allelopathic effects of small grain cover crops on cotton plant growth and yields

GS02-012 Optimizing Water Use for Three Old World Bluestems in the Texas High Plains

LS97-082 Sustainable Crop/Livestock Systems in the Texas High Plains

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